CEM REPORT 4133-475

TECHNOLOGY TRANSFER IN THE MARINE ENVIRONMENT OF LONG ISLAND

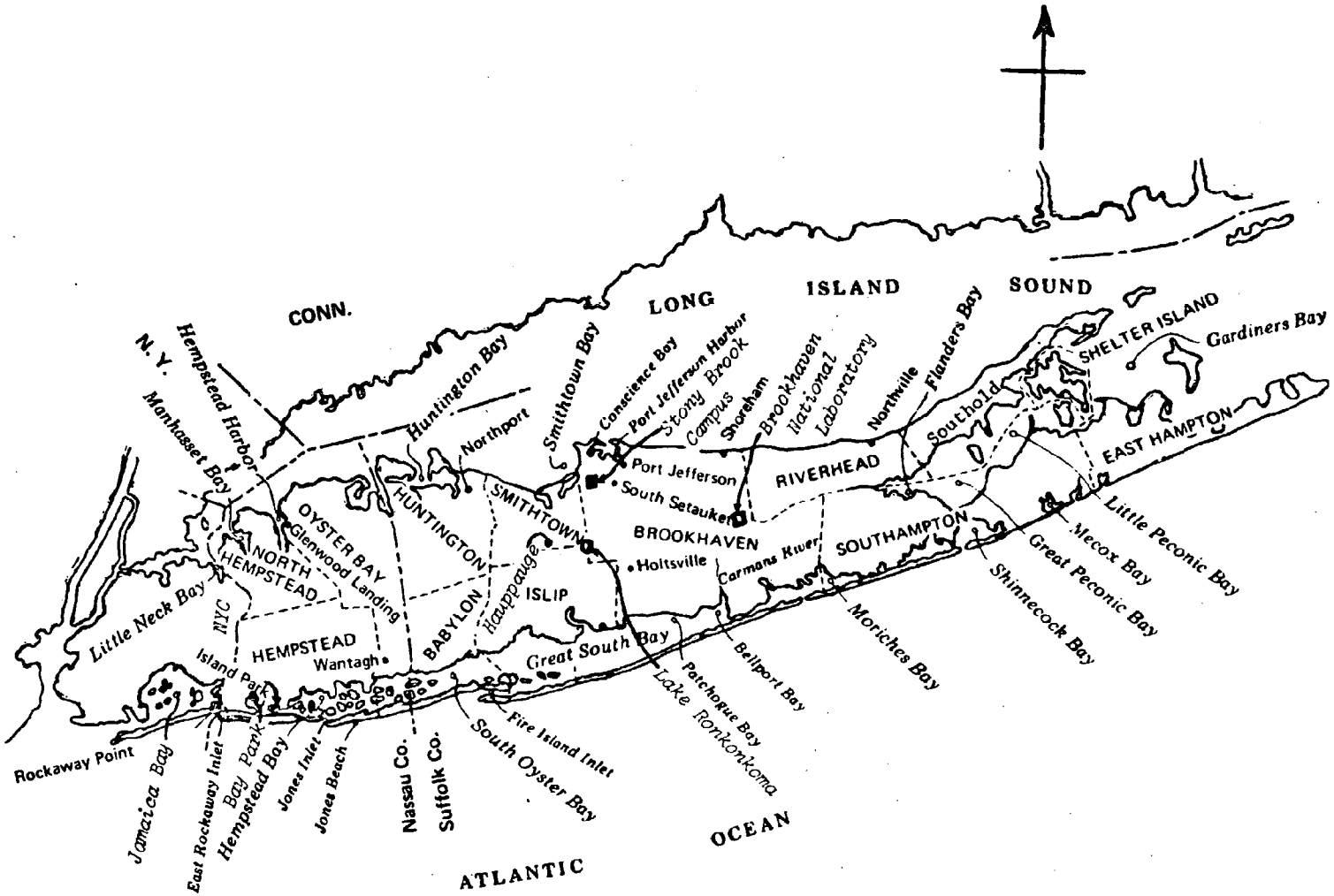
Prepared for the
Marine Resources Council
Nassau-Suffolk Regional Planning Board

Under
Sea Grant Project NG-18-72
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

February 1973

W. V. McGuinness, Jr.
R. Pitchai
G. M. Northrop

Regional Marine Resources Council
A Committee of the Nassau-Suffolk Regional Planning Board


CONN.
LONG ISLAND SOUND
N.Y.
Hempstead Harbor
Manhasset Bay
Huntington Bay
Northport
Smithtown Bay
Conscience Bay
Port Jefferson Harbor
Stony Brook Campus
Shoreham
Brookhaven National Laboratory
Northville
Flanders Bay
Southold
SHELTER ISLAND
Gardiners Bay
EAST HAMPTON
Port Jefferson
South Setauket
RIVERHEAD
OYSTER BAY
Glenwood Landing
HUNTINGTON
SMITHTOWN
BROOKHAVEN
Holtsville
Carmans River
SOUTHAMPTON
Little Peconic Bay
Mecox Bay
Great Peconic Bay
Shinnecock Bay
NORTH HEMPSTEAD
Little Neck Bay
RVC
Island Park
HEMPSTEAD
Wantagh
BABYLON
Hauppauge
ISLIP
Great South Bay
Bellport Bay
Moriches Bay
Patchogue Bay
Lake Ronkonkoma
Fire Island Inlet
South Oyster Bay
Rockaway Point
Jamaica Bay
East Rockaway Inlet
Bay Park
Hempstead Bay
Jones Inlet
Jones Beach
Nassau Co.
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THE CENTER FOR THE ENVIRONMENT & MAN, INC.
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FOREWORD

This report is part of a series of studies undertaken by The Center for the Environment and Man, Inc., for the Regional Marine Resources Council of the Nassau-Suffolk Regional Planning Board under the continuing program: The Development of Methodologies for Planning for the Optimum Use of the Marine Resources of the Coastal Zone. The program is funded in part by the Sea Grant Program of the National Oceanic and Atmospheric Administration, U.S. Department of Commerce, and is structured into six functional steps.

Functional Step One (Problems). Identifies, classifies and briefly analyzes the problems that confront planners and decision makers with regard to the area's marine resources.

Functional Step Two (Knowledge Requirements). Identifies the knowledge necessary for making sound decisions with regard to the use of the marine resources.

Functional Step Three (State-of-the-Art). Assesses the availability and adequacy of the necessary data and knowledge.

Functional Step Four (Knowledge Gaps). Determines necessary data collection and research activity.

Functional Step Five (Data Collection and Research Program). Formulates a priority-oriented, marine-related data collection and research program and monitors its implementation.

Functional Step Six (Management Information System). Develops a system for organizing and synthesizing the knowledge and data and provides analyzed information to marine resource planners.

Functional Steps One through Four, and most of Functional Steps Five and Six were completed in the first and second year of the Sea Grant Program of the Marine Resources Council and have resulted in previous reports of this series (see references 45 through 58, Appendix A). This report summarizes CEM's activities during the third year of the Sea Grant Program in support of the Council's adoption of guidelines and research program for Long Island's marine resources planning. It derives basic inputs from Functional Steps One through Five and provides a characterization of the means and processes by which analyzed and evaluated information could be effectively made available to facilitate marine resource planning; in this sense, this technology transfer report is a product of Functional Step Six.

EXECUTIVE SUMMARY

This report presents the results of CEM's activity during 1972 and early 1973 in support of the third year Sea Grant Program of the Regional Marine Resources Council ("the Council") of the Nassau-Suffolk Regional Planning Board. The scope of the Program included adoption of the Council's Guidelines and research program, research guidance and monitoring, and technology transfer to marine resources planners, cognizant agencies and the scientific community. The major emphasis during this phase of the Program has been on the adoption, by the Council, of marine-oriented policy and planning guidelines and recommended high-priority research applicable to Long Island.

CEM provided technology transfer support to the Council in the attainment of their objective by:

- Providing briefings of the analysis and findings of four high-priority problem areas for Long Island, including recommendations for research:
  - Integrated Water Supply and Wastewater Disposal
  - Coastal Stabilization and Protection
  - Dredging
  - Wetlands
- Interaction with Council Committees to provide assistance and to help formulate Committee reports on guidelines related to the four high-priority problem areas;
- Holding public seminars at academic institutions on Long Island to describe and review the high-priority marine and marine-related research needs of Long Island;
- Reviewing the Council's draft guidelines and providing supporting research and documentation; and
- Cataloging the technology transfer activities contained in this report.

At the time of publication of this report, the Council's Guidelines are being reviewed by the Regional Planning Board. They are the first of this kind for Marine Resources Planning in the U.S. Coastal Zone. Final modification and endorsement by the Regional Planning Board is expected by mid-1973. The guidelines will then be available from the Council.

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1.0 INTRODUCTION

1.1 Purpose of the Report

The purpose of this report is to describe the actions taken throughout 1972 and early 1973 by the Regional Marine Resources Council ("the Council") of the Nassau-Suffolk Regional Planning Board ("the Board") to improve the relevancy of research to the solution of selected, high-priority coastal zone management problems confronted by comprehensive planners and decision makers in Nassau and Suffolk Counties, Long Island, New York.

The report is also intended as a summary of the interrelated activities of the Council and The Center for the Environment and Man, Inc. (CEM) which were performed to create public, governmental, and institutional awareness of:

- high-priority marine-oriented problems confronting Nassau and Suffolk Counties;
- assessment of the state-of-the-art of research to cope with these problems;
- recommended research to fill information and knowledge gaps associated with the problems; and
- tentative guidelines to be used by policy and decision makers in mobilizing efforts to solve the problems.

To accomplish this stated purpose required a transfer of technology—from the experiences of researchers and the pages of technical reports— to the concerned public, government officials, and staff members and students of Long Island institutions. What was done and how this technology transfer was carried out is presented in this report. A final purpose of the report is, then, to document experiences and provide a guide for others who may want to perform technology transfer to solve marine environmental and coastal zone management problems.

1.2 Background

1.2.1 The Island

Long Island, New York, stretches 120 miles from its western edge in Brooklyn to its eastern tip at Montauk Point. No location on the island is more than 10 miles from salt water. In 1970, 7.145 million people lived on the island. Together with many summer vacationers and day visitors from adjacent metropolitan areas (especially from Manhattan and the Bronx), they share the island's 1,723 square miles, 791-mile coastline and adjacent waters.

Two of the counties, Kings and Queens, are part of New York City. Although they account for only 14 percent of the island's total land area, they contain 64 percent of its 1970 population. Population in these two counties, however, is relatively stable. For example, it increased by only 3.5 percent in the period 1960—1970.

This report focuses on the marine environment of the rapidly growing Nassau-Suffolk bi-county area. Currently this less-populated part of Long Island has only 2.5 million people (larger than 23 states) but population growth has been rapid. After World War II and up until about 1960, Nassau laid claim to being the fastest growing county in the country. Population growth there began to level off between 1960 and 1970 (up approximately 10 percent). Suffolk, however, has had a ten-fold increase in population during the last half century and is projected to accommodate an additional 1.5 million people (the current population of Dallas or Cincinnati) in the next 27 years.

Demands placed on the bi-county area's marine resources derive primarily from this population base—the 2.5 million bi-county inhabitants plus many of the 10 million residents of the Greater New York area who move to Nassau-Suffolk as summer vacationers or day visitors.

Eventually the decision must be made (1) for increased management of the environment—including its social, economic, and natural components—or (2) for continuing primary dependence upon a more laissez-faire pattern governed principally by individual economic-environmental tradeoffs (e.g., the time and dollars tradeoff associated with living "out on the Island" in a suburban-rural environment, but working "in the City").

1.2.2 The Board

To provide a rational management structure to cope with growth problems, the Nassau-Suffolk Regional Planning Board was formed in 1965 with Leonard W. Hall, Esq., as Chairman and Lee E. Koppelman, R.L.A., as Executive Director (see Fig. 1). The Board has prepared the Nassau-Suffolk Comprehensive Development Plan and 30 supporting publications covering such subjects as transportation, housing, employment and income, land use, taxing strategies, growth projections, soil interpretations, utilities, fiscal inventories, zoning and socio-economic analyses of census data.* Although the Nassau-Suffolk Comprehensive Development Plan is not legally binding on each county, town, and zoning board, it has been widely endorsed throughout the bi-county area.

1.2.3 The Council

One of the earliest acts of the Board was to place emphasis on the marine environment by establishing its Oceanographic Committee. After a year of researching the status and potential of the marine environment, two major recommendations were made:

1. Establishment of a Regional Marine Resources Council;
2. Development of a research program culminating in a methodology for marine resources planning for the bi-county area of Long Island.

The Council was established in 1967 and has served the Board as a special advisory committee and as the administrative agent for the research program. Chaired from its inception by Rear Admiral Edward C. Stephan (USN-retired), the Council's membership is representative of the many and varied interests utilizing the coastal zone for their livelihood or enjoyment. There are 16 voting members, eight from each

*References and bibliographies are found in Appendix A.

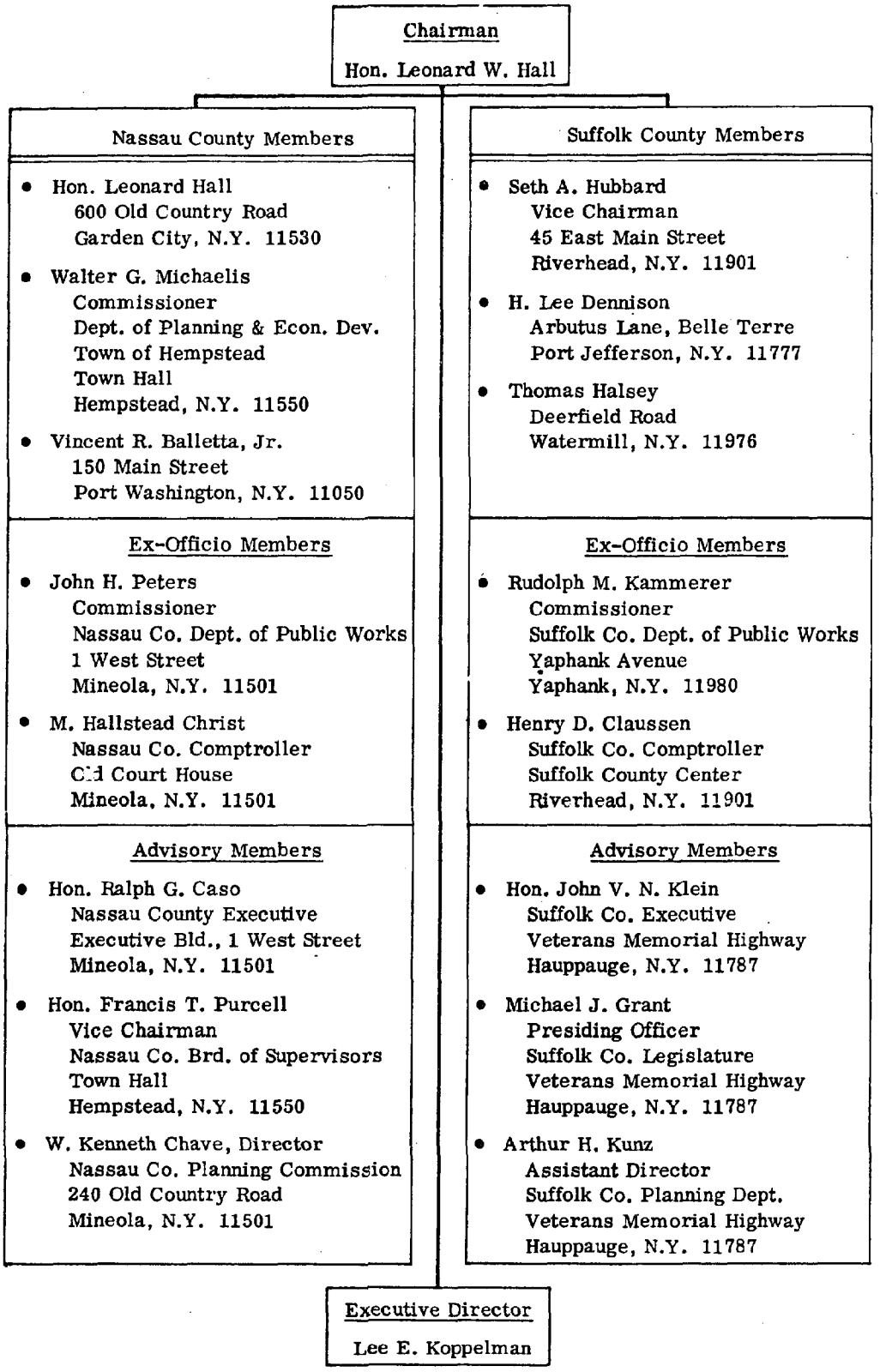

Fig. 1. Nassau-Suffolk Regional Planning Board.

county, representing leading academic institutions, industries, recreation interests, agriculture, fishing, conservation and preservation interests. Sitting as advisory members are five representatives of county government, four representatives of the state, eight representatives of Federal agencies, and one representative from a private environmental group. All members voluntarily contribute their time, efforts, and expertise to the public interest. (Appendix B gives a list of current members and their affiliations.)

Regular Council meetings with published minutes have been held semi-monthly over the last six years. Attendance has averaged 20—25 Council members and staff, and on occasion, as many as 5 to 25 guest speakers and visitors. Special meetings, such as seminars, site visits and public hearings, have drawn 100 or more attendees. Committees of the Council arrange special meetings of their own.

1.2.4 The Council's Program

The research program of the Marine Resources Council has been financed by the Board and by the National Sea Grant Program, formerly in the National Science Foundation and now in the National Oceanographic and Atmospheric Administration of the U.S. Department of Commerce. The Council was the first non-academic institution to be funded by Sea Grant.

The Center for the Environment and Man, Inc.,—formerly The Travelers Research Corporation—of Hartford, Connecticut, was selected in 1968 as research program consultant. Six functional steps were outlined in 1969, and developed in a series of reports. Table 1 outlines these steps, together with the 14 related reports prepared by CEM, two reports prepared by the Council staff, and four reports prepared for the Council by the Marine Sciences Research Center, State University of New York, at Stony Brook.

Seventeen marine resource problems were originally identified. Following review, three were de-emphasized and Functional Steps One and Two were carried out for the remaining 14 problems. It became evident, however, that a major re-orientation of the technical planning information was required to make it useful to planners and decision makers.

To insure that the information about technology could be transferred to the planning/decision making/administrative community, the 14 problems were consolidated and given priorities so that more intensive investigation could be concentrated on four major subject areas:

- integrated water supply and wastewater treatment and disposal;
- coastal stabilization and protection;
- dredging and spoil disposal; and
- wetlands management.

TABLE 1
FUNCTIONAL STEPS AND RELATED REPORTS

FUNCTIONAL STEPS	RELATED REPORTS	REF. NO.
1. PROBLEMS. Identify, classify and briefly analyze the area's marine resources planning problems.	The Status and Potential of the Marine Environment, Oceanographic Committee Dec. '66.	31
	Functional Step One: The Classification of Marine Resources Problems of Nassau and Suffolk Counties, CEM, May '69.	45
	Fourteen Selected Marine Resources Problems of Long Island, New York: Descriptive Evaluations, CEM, June '70.	46
2. KNOWLEDGE REQUIREMENTS. Categorize the data and knowledge requirements for meaningful decision making in marine resources management.	Functional Step Two: Knowledge Requirements, CEM, Feb. '70.	47
3. STATE OF THE ART. Assess the availability and adequacy of the necessary data and knowledge. 4. KNOWLEDGE GAPS. Determine required data collection and research activity.	Proceedings of the Conference on Shellfish Culture, Marine Resources Council, Dec. '69.	32
	Quality Standards for the Coastal Waters of Long Island, New York, CEM, Apr. '70.	48
	The Movement and Quality of Coastal Waters: A Review of Models Relevant to Long Island, New York, CEM, Jul. '70.	49
	High Priority Research and Data Needs (an interim report), CEM, Nov. '70.	50
	Integrated Water Supply and Waste Water Disposal on Long Island, CEM, Feb. '72.	51
	Coast Stabilization and Protection on Long Island, CEM, Feb. '72.	52
	Dredging on Long Island, CEM, Feb. '72.	53
	Wetlands on Long Island, CEM, Feb. '72.	54
	State of the Art for Selected Marine Resources Problems on Long Island, CEM, Feb. '72.	55
	Proceedings of the Seminar on Advanced Wastewater Treatment and Disposal, Marine Resources Council, Jul. '72.	33
5. DATA COLLECTION AND RESEARCH PROGRAM. Formulate a priority-oriented, marine-related data collection and research program, and monitor its implementation.	A Proposed Problem-Oriented Marine Research Program for Long Island, CEM, Feb. '72.	56
	Guidelines for Marine Resources Planning and Policy on Long Island, CEM, Feb. '72.	57
	Hydrographic Data Report: Long Island Sound—1970, Part II, Stony Brook, Jan. '72.	36
	Characteristics and Environmental Quality of Six North Shore Bays, Nassau and Suffolk Counties, New York, Stony Brook, Jan. '72.	37
	Survey of Water Quality and Sediments in Six North Shore Bays, Nassau and Suffolk Counties, New York, Stony Brook, Feb. '72.	38
	The Marine Wetlands of Nassau and Suffolk Counties, New York, Stony Brook, Mar. '72.	39
6. MANAGEMENT INFORMATION SYSTEM. Develop a system for organizing and synthesizing the data and knowledge.	The Design of a Management Information System for Coastal Resources Planning, CEM, Feb. '72.	58

1.3 Outline of the Report

The remainder of this report summarizes the activities of CEM during 1972 and early 1973 in providing technology transfer assistance to the Council in creating public, governmental, and institutional awareness of the research, recommendations and guidelines resulting from work performed for the Council by CEM and others throughout the period: 1969—1971.

Section 2 tersely outlines CEM's activities in assisting the Council in technology transfer in the marine environment of Long Island. A major feature of this technology transfer process was the explanation and refinement of policy and decision making (draft) guidelines for four high-priority problem areas, which had been submitted to the Council by CEM in early 1972. Section 3 documents respective roles of the Council, the guidelines advisory Committees formed by the Council, and CEM in achieving adoption of a final set of guidelines by the Council and submission of the guidelines to the Board for review.

In undertaking this process of research to support policy and decision making and technology transfer in the marine environment,the Council has undertaken a pioneering effort. Section 4 compares the guidelines generated by the Council with similar efforts in the draft stage recently adopted in other coastal zone regions of the nation.

The references and bibliography for this report are given in Appendix A. The members of the Council and their affiliations are found in Appendix B. The memberships of the four Committees established by the Council to review and recommend guidelines for the high-priority problem areas are given in Appendix C. Agendas of presentations to the Council by Federal agencies are found in Appendix D.

1.4 Uses of the Report

The primary users of this report are expected to be the Regional Marine Resources Council and its parent body, the Nassau-Suffolk Regional Planning Board. The interests of the Board are bi-county and comprehensive—they cover the long-range preservation, use and development of the entire area, inland as well as coastal. The report reflects these interests by considering the coastal dimensions as important, but subordinate, parts of the overall problem. For the Council to be responsible and successful, its coastal input must be formulated within a broad objective understanding of the overall problem.

In addition to serving the Council's needs, the report should provide insights for the research community on Long Island and elsewhere. Although the research needs and guidelines have been derived from analyses of Long Island problems, there is a high degree of commonality with needs and guidelines in other coastal zones.

The methodology employed herein, particularly the approach followed and the lessons learned, should be of value to those concerned with coastal zone management problems elsewhere, for they too must confront and solve the problem of technology transfer in the marine environment.

Lastly, these summarized comments provide one additional case history of an attempt to create public, governmental, and institutional awareness of, and interaction with, the products of research in support of policy and decision making. The report should, therefore, be of value to those involved conceptually or pragmatically in the general process of technology transfer.

2.0 CEM TECHNOLOGY TRANSFER ASSISTANCE

2.1 Introduction

In developing methodologies for planning for the optimal utilization of the coastal zone's resources, it is not enough to be able to analyze and evaluate the state-of-the-art of high priority problems and indicate what needs to be done. It is equally essential that the findings be effectively communicated to planners and decision makers, thereby facilitating rational action. The results of the activities undertaken in 1970 and 1971 by the Council are available in reports cited in Appendix A. A clear need exists for transferring this technology to planners, decision makers, and the scientific community of Long Island. During this phase, the role of CEM has been to serve as a catalyst in bringing about the transfer of technology to assist in the adoption of the Council's Guidelines and research program. This section summarizes the support activities undertaken by CEM to achieve these goals.

2.2 Objective of the 1972 Program

The objective of the 1972 program was to:

> Improve the relevancy of research to the solution of the four selected high-priority coastal management problems confronted by comprehensive planners and decision makers in the bi-county area; namely,
>
> - Integrated Water Treatment and Wastewater Disposal
> - Coastal Protection and Stabilization
> - Dredging
> - Wetlands.

The objective was attained by achieving four contributory goals:

- Adopting a priority-oriented research program and major planning and policy guidelines. (Task 1)
- Using this program and the guidelines in a systematic way to make the research community more aware of the most important needs of policy formulators and planners. (Task 2)
- Making policy formulators and planners more aware of the relevant findings of the research community. (Task 3)
- Melding the first three contributing goals into a systematic interplay between the continual reformulation of guidelines, the readjustment of relevant research programs, and the prompt incorporation of research findings into policies and plans. (Task 4)

Figure 2 outlines the steps involved. The next section describes the approach taken.

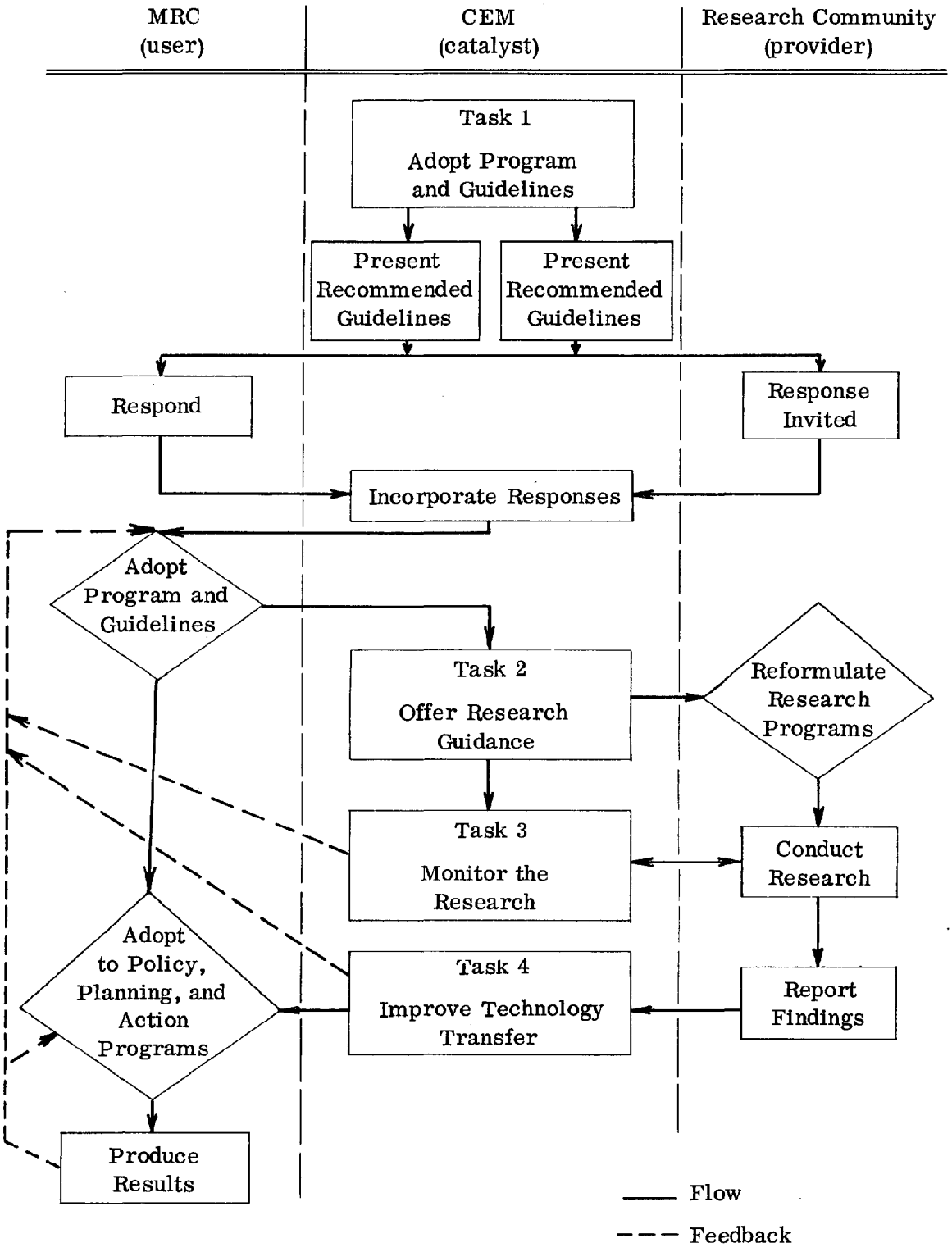

Fig. 2. Technology transfer flow diagram.

2.3 Approach

The approach used for accomplishing Tasks 1 through 4 is described below:

Task 1. Guidelines and Research Program Adoption

- Presentation of CEM-recommended research program and guidelines, together with the reports from which they derived;
- Response by the Council and by others whose opinion it solicits;
- Reformulation of the research program and guidelines by incorporating the response; and
- Adoption of the revised program and guidelines by the Council.

Task 2. Research Guidance

- Dissemination of the research program;
- Encouragement of its review and analysis; and
- Encouragement of its use in formulating future research.

Task 3. Research Monitoring

- Awareness of on-going research programs; and
- Correlation of these programs with the Council's needs.

Task 4. Technology Transfer

- Structuring the feeder reports for clarity and ease of understanding;
- Building up a dialogue; and
- Writing this report.

Each of the tasks is discussed in detail separately in the following pages. Task 1 is covered in depth in Section 3, since greater emphasis was placed on this task during the current year's program. Tasks 2 and 3 are discussed under Section 2.6, Research Needs Transfer. Task 4 is essentially embodied in this report.

2.4 Briefings

During the spring of 1972, CEM briefed the Council on all of its reports [Refs. 45 through 58] at the regular Council meetings in the main auditorium of the County Center at Hauppauge, New York, according to the following schedule:

Date	Report	Ref. No.	Presenters	Attendance
March 20, 1972	• Introduction • Dredging • Coastal Stabilization	53 52	Ellis Dowd McGuinness	26 Council & staff, 7 guests
April 3, 1972	• Water Supply and Wastewater • Wetlands	51 54	McGuinness Pitchai Zoellner Green	25 Council & staff, 10 guests, including the press
April 17, 1972	• State of the Art • Research Program	55 56	McGuinness McGuinness Pitchai	22 Council & staff, 8 guests
May 1, 1972	• Guidelines	57	Ellis McGuinness Pitchai Zoellner	27 Council & staff, 13 guests
June 19, 1972	• Management Information System	58	Ellis Cheney	17 Council & staff, 20 guests

Advance copies of the CEM reports were distributed to the Council members and staff and other selected parties. All were encouraged to read the reports before the scheduled CEM briefing. As could be seen from the attendance record above, keen interest was evidenced in the contents of the presentations.

Each of the four high-priority problem area reports, presented on March 20 and April 3, 1972, consisted of:

- Analysis and assessment, including a definition and description of the problem, a presentation of the key facts bearing on the problem, an analysis, a delineation of alternative solution strategies, an evaluation and recommended solutions.
- State-of-the-Art expressed as a heavily-documented synthesis of the pertinent facts bearing on the analysis and assessment.
- Research program expressed as an itemization of the major inadequacies in the current state-of-the-art interfering with the search for solutions.
- Guidelines expressing the recommended solutions in terms of broad policy and planning statements.

It is not possible in this report to describe the details of each briefing. However, highlights of the briefings are given in the next section. For the interested reader, reports from which the CEM briefings were taken are available from the Council. All reports are open to public review at the Council's Headquarters, Veterans Memorial Highway, Hauppauge, New York, 11787.

2.4.1 Four Problem Areas

Highlights of the CEM briefings on the four high priority problem areas on Long Island are presented in summary form below.

2.4.1.1 Dredging

- Location and contents of major dredging applications
- Significance of dredging (removal) phase on water quality and biota
- Significance of dredge spoil disposal on marine environment
- Structure of existing Corps approval procedures
- Type of applications and percent approval

2.4.1.2 Coastal Stabilization and Protection

- Effects of natural phenomena and human interactions
- Physical characterization of Long Island shoreline
- Shoreline ownership pattern in Long Island
- Critical and non-critical erosion areas and location
- Summary of reach-by-reach analysis
- Summary of Guidelines

2.4.1.3 Integrated Water Supply and Wastewater Disposal

- Water budget for Long Island: natural and man-influenced
- Contamination of water in the man-influenced hydrologic system
- Possible effects of unrecharged groundwater usage in the future
- Identification and evaluation of alternative, integrated water supply and wastewater disposal systems
  - costs
  - general environmental impacts
  - major political/jurisdictional considerations

- Range of choice in four surviving alternative systems
- Advanced wastewater treatment (AWT) technology overview
  - improvements in municipal wastewater treatment
  - solids removal, suspended and dissolved
  - wastewater renovation and reuse
  - ultimate disposal methods
  - physical-chemical processes vs AWT as "add-on" secondary treatment
  - cost comparisons
- Forty-seven recommended data collection and research needs for resolving water supply/wastewater related issues
- Recommended guidelines for Council consideration

2.4.1.4 Wetlands on Long Island

- Comprehensive wetlands management considerations
  - moratorium and acquisition
  - classification, inventory and quality evaluation
  - plan preparation and implementation
  - physical and non-physical management techniques
- Recommended wetlands guidelines on policy and planning, research and analysis, and Council responsibility and activity

2.4.2 Recommended Research

The data and knowledge assessments contained in the four problem-area reports and elsewhere were integrated in a State-of-the-Art report [55] into an eight-category generic framework closely correlated with research disciplines. The report is documented with 377 selected citations of the most relevant current literature.

The inadequacies in data and knowledge identified in earlier reports were organized into an applied, problem-oriented marine research program for Long Island [56]. The program recommends 77 projects divided into priority-rated quartiles and is expected to have a price tag of about $25 million in 1971 dollars. However, costs can be significantly reduced by drawing upon the findings of relevant research outside of Long Island (technology transfer) and by emphasizing projects with the highest priorities and benefit/cost ratios. The report includes, for each of the 77 projects, a set of descriptors such as:

- Short title and number
- Classification by generic group
- Degree of relationship to marine environment
- Adequacy of supplementary data and information base
- Feeder relationship to other projects
- Probable degree of public interest
- Current status (whether underway)

- Value of results for problem-solving
- Probable level of effort
- Benefit/cost ratio
- Breadth of applicability of results
- Potential sponsors
- Key references where project is discussed in detail, and
- Relative priorities.

Table 2 is an extract from the research program report providing an overview of the diversity and characterization of individual projects in the program. The briefings by CEM on April 17, 1972, covered highlights of both the "State-of-the-Art of Research" related to Long Island problems and "Recommended Research."

TABLE 2

PRIORITY-RATED RESEARCH PROJECTS* PROPOSED IN LONG ISLAND PROGRAM

Project No.*	Project Title	Value of Results	Priority
101.	Water usage data	C	C
102.	Wastewater inventory	B	B
103.	Unit cost data	A	A+
104.	Ocean dumping data	C	C
105.	Survey of sports fish catch	D	D
106.	Beach attendance data	C	C
107.	Coastal use survey	A	A
108.	Man-induced surface changes	B	B
109.	Inventory of land use regulations	C	C
110.	Inventory of major development plans	C	C
111.	Usage of dredged spoil areas	C	C
201.	Monitoring groundwater levels	B	B
202.	Onshore geological information	D	D
203.	Offshore geological information	A	A
204.	Offshore sand inventory	A	A-
205.	Wetlands classification and inventory	A	A+
206.	Water quality data bank	C	C
207.	Coastal water quality monitoring system	A	A+
208.	Monitoring groundwater quality	B	B
209.	Monitoring possible land subsidence	D	D
401.	Future travel times	C	C
402.	Future public values	C	C
403.	Offshore petroleum	B	B+
404.	Future industrial water requirements	D	D
405.	Future coastal usage	A	A
406.	Information on water quality violations	B	B
407.	Adequacy of coliform standards	B	B
408.	Adequacy of bacterial pollution indices	D	D
409.	Adequacy of thermal discharge criteria	C	C
410.	Improving water transport system design	B	B
501.	Evapotranspiration processes	B	B
502.	Infiltration processes	B	B
503.	Movement of contaminants in groundwater	B	B
504.	Movement of contaminants in bays	C	C
505.	Movement of contaminants in the ocean	D	D
506.	Salinity changes in bays	D	D
601.	Contaminant effects in bays	B	B-
602.	Salinity effects in bays	A	A+
603.	Toxic effects in the food chain	C	C
604.	Contaminant effects of ocean outfalls	A	A+
605.	Contaminant effects of ocean dumping	C	C
606.	Contaminant effects of oil spills	D	D
607.	Effects of potholes	D	D
608.	Effects of inlets on biological exchange	C	C
609.	Eelgrass control	D	D
610.	Ecology-productivity analysis of wetlands	C	C
701.	General usage impacts	B	B+
702.	Fish diversity and density	C	C
703.	Feasibility of opening shellfish areas	C	C
704.	Feasibility of requiring depuration	B	B-
705.	Impact of groundwater level changes	A	A
706.	Limit to cesspool sites	D	D
707.	Extent of beach closures	C	C
708.	Understanding wetland values	B	B
801.	Surface hydrological accretion model	B	B
802.	Subsurface hydrological model	A	A-
803.	Groundwater quality models	B	B
804.	Water quality models in bays	A	A-
805.	Water quality models in the ocean	D	D
806.	Predictive inlet models	A	A
807.	Feasibility of importing water	A	A+
808.	Feasibility of desalination	D	D
809.	Feasibility of iron removal	D	D
810.	Feasibility of leakage control	D	D
811.	Feasibility of evaporation control	C	C
812.	Feasibility of sewer infiltration control	C	C
813.	Feasibility of AWT	B	A-
814.	Feasibility of packaged treatment plants	D	D
815.	Feasibility of recharge by injection	C	C
816.	Feasibility of recharge by spray irrigation	B	B
817.	Feasibility of recharge through storm basins	B	B
818.	Feasibility of stream recharge	A	A+
819.	Feasibility of dir. recycling of AWT effluent	D	D
820.	Value judgments on water systems	A	A+
821.	Feasibility of land use management techniques	B	B
822.	Screening of dredging applications	A	A
823.	Wetlands management	A	A

*The projects and project numbers are explained in detail in Ref.56,"A Proposed Problem-Oriented Marine Research Program for Long Island."

LEGEND	
Value of Results:	A = Highest; B = Relatively High; C = Relatively Low; D = Lowest.
Priority:	A = Top Quartile; D = Bottom Quartile, among all high-priority projects.

2.4.3 Guidelines

A briefing on the CEM guidelines covering the four high-priority problem areas was given to the Council on May 1, 1972. The briefing stressed that the guidelines section of each of the subject area reports was reworked by CEM/Committee interaction to produce a succinct, integrated guideline draft report. By deliberate choice, much of the reasoning and analyses which are found in the supporting reports were not repeated in the guidelines draft report. For each of the four high-priority problem areas, a set of guidelines pertaining to policy and planning, research needed, and recommended Council action was outlined. Summary versions of the CEM guidelines presented in the briefings are given in Table 3. It is emphasized that the CEM guidelines preceded and are distinct and separate from the Council's own guidelines, which have been formulated and are now under review by the Board (see Section 3.5).

TABLE 3
HIGHLIGHTS OF CEM GUIDELINES FOR
FOUR HIGH-PRIORITY PROBLEM AREAS

Water Supply and Wastewater Guidelines	Dredging Guidelines
Policy and Planning • Groundwater Quality • Groundwater Use • Complete Recycling • Inland Sewering • Ocean Outfalls • Embayment Outfalls • Development Sewering Research and Analysis • Groundwater Recharge • Outside Water Supply Council Activity • Decision Framework	Policy and Planning • Classification System • "Major" Project Definition • Environmental Impact Statements • Physical, Chemical, Biological Descriptions • Monitoring Provisions • Dredging Spoil Deposits • County and Municipal Projects Research and Analysis • Spoil Disposal Alternatives • Predictive Models Council Responsibility and Activity • "Major" Applications • Progress Reports
Wetlands Guidelines	**Coast Stabilization and Protection**
Policy and Planning • Three-Stage Program 1 - Two-Year Moratorium 2 - Wetlands Acquisition 3 - Regional Land-Use Research and Analysis • Wetlands Classification • Inventory Council Responsibility and Activity • Wetlands Planning • Management Plan Design • Meetings and Hearings	Policy and Planning • North Shoreline Regression • North Shore Beaches and Navigation Channels • South Shore Beaches and Dunes • South Shore Inlets • South Shore Barrier Beaches and Estuaries • Eastern Forks Research and Analysis • Offshore Sand Inventory • Inlet Development and Stabilization • Models

2.5 Interactions with Council Guidelines Committees

An important part of CEM's technology transfer assistance activity was providing technical assistance to the four Committees appointed by the Chairman of the Council (see Section 3.2 for the Council's Committee activities) to draft Council guidelines. This activity was, by direction, at a restrained level. CEM was available on call either to clarify or explain the findings or recommendations contained in its reports [45 through 58]. Examples of this type of interaction, as well as others, are cited below.

On January 3, 1972, CEM participated in a public hearing organized by EPA, Region II Office, on the environmental impact of wastewater treatment facilities constructions grants for Nassau and Suffolk Counties, New York; the Council submitted a statement on the draft prepared by EPA.

On August 16, 1972, upon invitation, CEM attended a meeting of the Dredging Committee at Point Lookout, New York. CEM personnel had brief discussions with the other Committees at several Council meetings. There were many phone discussions and letters. This informal process was an effective means for incorporating CEM assistance into the independent reviews conducted by the Committees themselves.

At the meeting of August 21, Mr. A. Taormina and Mr. J. L. Renkevinsky of the New York State Department of Environmental Conservation discussed CEM's suggested guidelines on wetlands. On that date, members of the Coast Stabilization Committee received a guided tour of part of Fire Island, New York, sponsored by the Davis Park Fire Company and the Fire Island National Sea Shore of the National Park Service.

On September 15, the Council, in cooperation with the National Oceanic and Atmospheric Administration held a seminar on Wetlands Management (see Section 3.5.2 and Appendix D); CEM participated in the discussions.

On February 15, 1973, the Council, in cooperation with the U.S. Army Corps of Engineers, held a seminar on dredging and coastal stabilization problem areas; CEM members participated in the discussions. CEM members were also present at the October 30 and November 13, 1972,wastewater guidelines review sessions organized for the Council by the Suffolk County Department of Environmental Control.

At the direction of the chairman, CEM staff reviewed the draft guidelines document prepared by the Council and added supporting material by way of references and footnotes. Thereby, important statements are keyed to earlier CEM reports wherever applicable.

2.6 Research Needs Transfer

The objectives of this effort were the following.

1. Employ the Council's research program and guidelines adopted in Task 1 to guide the formulation of responsive applied research programs by cooperative research institutions.
2. Increase the Council's awareness of the on-going research on Long Island and elsewhere which is related to the Council's research needs.

Because the adoption of the Council's guidelines and research program was a thorough and deliberate process (as explained in Section 3) nearing completion, and the research needs transfer effort could not be postponed until the process was completed, CEM initiated the technology transfer with the presentations made to the Council in the spring of 1972 (see Section 2.4). Being public presentations, members of the research community (both academic and governmental) were present in the audience and participated in the discussion sessions. Thereby, a dialogue on responsive, problem-oriented applied research was established and continues to the present, between the Council and the research community in Long Island.

2.6.1 Research Reports Distribution

The awareness of the governmental and academic research community in Long Island and elsewhere to the research needs was enhanced by selective news releases. In October 1972, NOAA's "Sea Grant 70's," a newsletter carrying information on Sea Grant program activities across the country, published a feature article [60] on the Council's program. The reports prepared by CEM and others for the Council were listed in this feature and in a subsequent newsletter (November 1972). The publicity has resulted in over 170 requests to date for one or more reports, including the research program. CEM printed a total of more than 700 copies of their reports and the Council printed a total of 2,800 copies of the seven reports listed below.

Report Title	No. of Copies
Dredging on Long Island	300
Coast Stabilization and Protection on Long Island	300
Integrated Water Supply and Wastewater Disposal on Long Island	600
Wetlands on Long Island	500*
State of the Art for Selected Marine Resources Problems on Long Island	300
A Proposed, Problem-Oriented Marine Research Program for Long Island	500
The Design of a Management Information System for Coastal Resources Planning	300

*Note that the Council also printed 1,500 copies of "The Marine Wetlands of Nassau and Suffolk Counties, New York," prepared by SUNY, Stony Brook, bringing the number of copies printed of reports on wetlands to a total of more than 2,000.

2.6.2 Research Seminars

In order to encourage study of the research program and further its implementation, CEM staff conducted seminars on the proposed research programs in Long Island according to the schedule shown below.

Date	Location	CEM Staff Participating	Audience
November 21, 1972	Institute of Marine Science Adelphi University Idle Hour Boulevard Oakdale, New York 11769	W.V. McGuinness, Jr. R. Pitchai	Dr. H. Brenowitz, Director; 4 staff members; 20 students
1972	Marine Sciences Research Center, State University of New York, at Stony Brook, New York	W.V. McGuinness, Jr. R. Pitchai	Mr. Fred Roberts, Assoc. Director; approx. 30 public officials, faculty and students

At these seminars, an overview of the methodology used to derive and structure the program was given, followed by a brief outline of the contents of the program. Approximately half the sessions were devoted to audience participation by way of interaction with CEM staff. Keen interest was evidenced on the methodology employed to assign priority to individual projects. CEM also learned that the problem-area reports [51—54] are being used as references in Marine Science courses in Long Island (for example, in a course on marine and marine-related problems at the Stony Brook campus of the State University of New York).* During several presentations to the Council by the academic/research institutions in Long Island, the awareness of and responsiveness to needed research by the academic community has become evident.

Research on the high-priority marine and marine-related problems, presently underway and being planned by governmental agencies, was presented in seminars organized by the Council, where personnel from the appropriate agencies participated. The schedule of such public seminars and their contents are covered in some detail in Section 3 (Guidelines Adoption Process).

2.7 Technology Transfer Report

The presentations made by CEM, interactions with the committees of the Council, discussions with faculty and students at academic institutions, technical assistance to the Council in formulating their guidelines and research program, and writing this report have been important parts of the technology transfer effort. Based on these, the Council and other interested parties have an opportunity to reflect on the program's accomplishments, its effectiveness, and the scope of future efforts. Within a broad

*Personal communication.

definition of technology transfer as the establishment of a rapport between people who need answers to solve their problems and people who can produce such answers, the accomplishments of the Council and their staff are open for all to see. The Council's Guidelines and research program have been formulated and submitted to the Board. The Council is a sub-element of the Regional Planning Board and, as such, its effectiveness in planning is reflected in its responsiveness to the needs of the Comprehensive Plan for the bi-county region. Further efforts at critically evaluating the coastal dimensions of the master plan for the region are continuing.

3.0 GUIDELINES ADOPTION PROCESS

The purpose of this section is to review briefly the process by which the Council formulated and adopted its guidelines relative to the four high-priority marine problems in Long Island. The Council views their guidelines as a distinctive contribution to marine resources planners and decision makers in Long Island and elsewhere, because the guidelines have been derived over the past three years from problem analysis, state-of-the-art review, and research needs identification. The Council created a deliberate process of public review and interaction before the guidelines could be adopted and submitted for consideration by the Regional Planning Board. The activities undertaken for public review and interaction are described below.

3.1 CEM Presentations

The guidelines adoption process began with CEM presentations of its recommended research program and guidelines, together with the four high-priority problem area reports. The presentations took place in the spring of 1972, as explained above in Section 2.4. They were open to the public and were well attended. Prior distribution of CEM reports insured an active participation by the Council and members of the audience, and set the stage for the following activities.

3.2 Council Committee Activities

Prior to the presentations, the Chairman of the Council, RAdm. E. C. Stephan, announced that he would be forming committees of Council members to review each problem area report, evaluate CEM-suggested guidelines, and formulate draft guidelines for consideration by the full Council. The Council members, accordingly, were well prepared to discuss with CEM staff their problem areas of interest during and after the presentations.

3.2.1 Formation of Committees

At the start of the third briefing (April 17, 1972), RAdm. Stephan announced the four Council Committees for guidelines with the following as chairmen.

Council Committee	Chairman
Committee on Integrated Water Supply and Wastewater Disposal (Short title: Wastewater Committee)	Leo Geyer, Deputy Director Ocean Systems Dept. Plant 30 Grumman Aerospace Corp. Bethpage, New York
Committee on Coast Stabilization and Protection (Short title: Coast Stabilization Committee)	Matthew M. Klein Hauppauge, New York
Committee on Dredging & Spoil Disposal (Short title: Dredging Committee)	Harold F. Udell, Commissioner Dept. of Conservation & Waterways Town of Hempstead
Committee on Wetlands Management (Short title: Wetlands Committee)	Edward D. Patterson, Director Nassau County Museum of Natural History Glen Cove, New York

Each Committee comprised seven to nine voting and advisory members. A few appointees, at their own request, were reassigned to Committees of their choice. In general, the Committee assignments reflected the principal areas of expertise and interest of the appointees.

An alternative approach to Committee assignments would have been to mix the appointments so that each Committee was composed of (1) a few with considerable experience in the subject area, (2) a few with high personal interest but little experience, and (3) a few with little experience or interest or even some disagreement with the prevailing mood (i.e., want to fill in wetlands, do more dredging, stop all shore protection efforts, or de-emphasize water quality).

The choice of method reduces to deciding whether to make maximum use of existing knowledge and dedicated interests of unpaid public-spirited members or to forfeit some of these advantages in order to attempt to obtain broader objectivity. In this case, the first choice, the more pragmatic of the two, was made.

For a list of all Council Guidelines Committee members and their affiliations, see Appendix C.

3.2.2 Instructions to the Committees

From the minutes of the Council meeting of April 17, 1972, the following extract is furnished:

"The mission of each Committee will be to:

1. assess the state-of-the-art for its study area;
2. develop guidelines relating to its study area; and
3. recommend research designed to fill in the major knowledge gaps of each of the study areas."

From the minutes of the Council meeting of May 15, 1972, extracted below, the wide scope of the Committee efforts becomes evident:

"Admiral Stephen described the tasks, needs, goals and responsibilities of the special Committees in developing their guidelines.

"By way of questions from individual MRC members, various points were clarified:

1. The final guidelines will cover all activities relating to the subject area and will not be limited to research recommendations, but rather will include action and planning aspects as well;
2. Individual Committees may hold unofficial mini-hearings, seek outside advice or do anything which will further their quest for information;
3. At present there will be no set format regarding guidelines presentation, etc. This aspect will be dealt with after some feedback has been reviewed by the staff.

"Since some members placed on one Committee may have expertise useful to another Committee, it was decided that a directory listing the name, position, telephone numbers (home included, if possible) and a brief description of the field of expertise of each member should be prepared."

At the meeting of July 10, 1972, September 25 was set as the deadline for the submission of the first drafts of the Committee reports.

3.2.3 Committee Reviews

The Council Committee reviews began at the meeting following the appointment of Committees. At that time (May 1, 1972), the members present seated themselves in proximity to the chairmen of their assigned study areas. This arrangement allowed for the input of some combined Committee impact during the discussion following CEM's presentation of its recommended guidelines for each of the four problem areas.

The desirable extent of CEM's interactions with the Committees was weighed by the Council Chairman. He observed that CEM had presented its reports and recommendations and now it was time for the Committees to develop their own conclusions. Although CEM could certainly help the Committees, he felt that the merits of essentially completely independent Committee review warranted a restrained level of CEM participation at this stage. Accordingly, the Chairman announced that after the Committees had become established and discussed the guidelines, CEM would be available to clarify or explain its findings. All of the Committees followed this guidance.

Parts or all of the Council meetings of July 10, August 7 and 21, and September 11 and 25 were devoted to the Council Committee reviews. The various Committees also met at other times on their own. Some of the presentations made to Committees by academic and governmental scientists, and field visits undertaken by the Committees have been cited earlier in Section 2.5. By and large, the entire review of CEM's suggested guidelines and the formulation of new draft guidelines, inclusive of recommended research, was made independently by the Committees.

3.2.4 Committee Reports

At the meeting of September 25, the Chairmen of the Coast Stabilization, Dredging, and Wetlands Committees presented their first draft reports and distributed a copy to each Council member present. Copies were mailed to all members who were unable to attend this meeting. The deliberations of the Committee on Integrated Water Supply and Wastewater Disposal were delayed for a further assessment of the state-of-the-art on coastal water quality modeling and advanced wastewater treatment with a view to assessing the potential impact of wastewater disposal on coastal and groundwaters. Presentations on these topics were made to the entire Council in the seminars organized by the Suffolk County Department of Environmental Control on October 30 and November 13, 1972. Further details of these presentations are given in the following section.

3.3 Council Action on Committee Reports

At the meeting of September 25, after the Committees had presented their draft reports and/or comments, the Council Chairman requested the views of those present on how the guidelines should be presented. He pointed out that there are two extremes on this matter: (1) that the guidelines should reflect the idealistic viewpoint of what is best for the natural environment, and (2) that the guidelines should take into consideration current social, economic and political factors for a more realistic approach. Most of the responses indicated that a compromise of the two extremes was probably the best approach to take. Admiral Stephan said that the Council staff would work to consolidate the draft reports and prepare an executive statement. Both would be presented to the Council for discussion. At the request of Mr. Matthew Klein, it was decided that the final guidelines statement would receive the vote and comment of all Council Members.

Staff action. In October 1972, the Council staff outlined the Council Guidelines Report. It was to consist of three parts: (1) the discussion (the main report with guidelines attached), (2) the enclosures, and (3) the references. The letter of transmittal and the introductory material for Part 1 were drafted.

These drafts were discussed with Council members at the regular meeting of October 16 and several changes were made in both documents as a result of constructive comments.

Following the January 8, 1973,meeting, the Council chairman integrated the CEM water supply/wastewater guidelines with those suggested by Commissioner Flynn of the Suffolk County Department of Environmental Control.

Working with the staff, CEM prepared worksheets to compare the substantive points in the CEM guidelines with parallel or differing points in the draft guidelines given in the Committee reports. CEM also prepared for consideration by the staff a working draft of one of the guidelines to serve as a model for format, style, and degree of documentation and detail.

3.4 Responses from Public and Private Agencies

The Chairman mailed copies of the Committee reports and CEM's reports to the major local, state and Federal agencies and requested review and comment. Responses were received from the Fish and Wildlife Service of the U.S. Department of the Interior, the New York State Department of Environmental Conservation, the Suffolk County Department of Public Works, the Suffolk County Department of Environmental Control and scientists at the State University of New York at Stony Brook. A suggested set of guidelines for wastewater was presented by the Suffolk County Department of Environmental Control on November 13, 1972, and revised on November 27, 1972. Copies of these responses were provided to each Council member on November 24. Council members wishing to submit written comments or make oral presentations were invited to do so at the Council meetings of December 4 and 18, 1972.

3.5 Subsequent Council Meetings on Guidelines and Research

3.5.1 Introduction

This section reviews the activities in the Council meetings from the submission of draft guidelines to the Council by the Committees, until the Council's Guidelines were finally transmitted to the Regional Planning Board. This review highlights the thoroughness with which the Council and its Committees exposed themselves to views from the general public, private citizens, and agencies in order to insure that the final guidelines document became a significant workable contribution to the planners and decision makers in Long Island. It also provides an illustration of the technology transfer inherent in such meetings.

3.5.2 Presentation by NOAA on Wetlands Management

On September 15, 1972, a seminar was sponsored by the Council at which scientists from Federal, state, and local agencies and academic institutions presented their points of view in briefings to the Council on the state-of-the-art, research needs, and guidelines for wetlands planning and management. Topics discussed at the seminar and the list of speakers are given in Appendix D. Council members participated fully in the discussion sessions which followed the presentation.

3.5.3 Presentation by Suffolk County Department of Environmental Control

The views of Nassau and Suffolk Counties on design, construction and study of outfall sewers, wastewater treatment and the implications of sewers on water resources development were presented to the Council in two seminars organized by the Suffolk County Department of Environmental Control. These presentations took place at the Council meetings held on October 30 and November 13, 1972, at the County Auditorium at Hauppauge.

Commissioner John Flynn of Suffolk County opened the seminars by discussing the current engineering studies of the Suffolk County Department of Environmental Control, especially the ocean outfall design for the Southwest Sewer District of Suffolk. Two of the consultants to the department discussed their special areas of interest in greater detail. Dr. Donald J. O'Connor of Manhattan College (and formerly of Hydroscience, Inc., Westwood, New Jersey) presented the water quality modeling studies conducted in connection with the location of the outfall sewer and concluded that effluent discharge three miles off the Fire Island coast would not damage the marine environment within acceptable standards. Dr. Edward Baylor of the Marine Sciences Research Center, State University of New York at Stony Brook, and a Council member, discussed studies undertaken to determine the potential effects of the southwest sewer district ocean outfall on marine life.

Speakers at the November 13th meeting included two other consultants to the Suffolk County Department of Environmental Control. Mr. Wallace Beckman, professional engineer of Consoer, Townsend and Associates, discussed the state-of-the-art and role of AWT techniques, and Mr. Robert Holzmacher, professional engineer of Holzmacher, McLendon and Murrell, described recharge feasibility studies of Suffolk County. At the end, Commissioner Flynn summarized the contents of the presentations and orally presented a list of water supply/wastewater treatment guidelines to the Council. Copies of these guidelines were subsequently provided for consideration by the Council.

3.5.4 Presentation of New York State Sea Grant Program

On January 8, 1973, Dr. Donald F. Squires, Director of the New York State Sea Grant Program, and staff members of the State University of New York at Stony Brook, Marine Sciences Research Center (MSRC), and SUNY, Binghamton,made presentations to the Council on marine research relevant to the high-priority problems of Nassau-Suffolk Counties. The goals of the New York State Sea Grant Program were stated as the conservation, management, exploitation, and improvement of the marine resources of the state. Dr. J. L. McHugh of MSRC summarized the results of his historical survey of the marine fisheries of New York State. Dr. Orville Terry of MSRC discussed his wetlands restoration, alteration, and creation (with disposal) studies. Dr. Donald Coates of SUNY at Binghamton described several projects constituting a long-range study of the geomorphology of Fire Island. Dr. Donald Squires discussed the organization of the Sea Grant Program and its interest in formulating research priorities and program goals on a yearly basis.

There are other on-going studies at MSRC of potential interest to the Council; some of these are the continuing program on coastal water quality monitoring, model studies for management of the Long Island Sound resources, development of new indices for coastal water quality, and interchange studies between sediments and water in the New York Bight.

3.5.5 Council Considerations of Draft Guidelines

As 1972 ended, the Council staff, under the leadership of RAdm. Stephan, drafted the revised version of the letter of transmittal and the guidelines document. These were considered at Council meetings early in 1973. The review by the public agencies, and comments and suggestions offered at the various presentations were useful in preparing the revised material which was ready for consideration and voting by the entire Council.

In the meetings of January 22 and February 5, 1973, the Council reviewed and voted on the letter of transmittal and the Council Guidelines report. The draft guidelines for wetlands, dredging, and coastal stabilization were reviewed, modified, and approved by the Council at the January 22 meeting. A subcommittee on water supply/wastewater further revised these guidelines. On February 5, 1973, the final draft of the water supply/wastewater guidelines was reviewed and approved by the Council.

3.5.6 Presentations by U.S. Army Corps of Engineers

On February 15, 1973, the U.S. Army Corps of Engineers, at the invitation of the Council, made a presentation on the state-of-the-art, current research and research needs related to the high-priority problem areas of

- dredging and dredged spoils disposal, and
- coastal stabilization and beach protection.

The presentation covered engineering as well as other measures. It included speakers from the New York District Office who discussed the dredging and coastal stabilization problems and control measures as they are directly applicable to Long Island. A complete list of speakers and topics is contained in Appendix D.

3.5.7 CEM Review Assistance

At the direction of RAdm. Stephan, CEM staff reviewed the final draft of the Council Guidelines with a view to adding relevant supporting information, as follows.

- Footnotes were added, keying significant statements, especially recommendations, to relevant passages in earlier CEM reports,
- References to earlier CEM reports and certain other supporting publications were cited at appropriate places, and a list of references was added.

3.5.8 Submission of Council Guidelines to the Board

At the time of publication of this report, the Council's Guidelines have been reviewed by all voting members of the Council, and submitted to the Regional Planning Board for:

- Review by the Board members and their agencies/organizations;
- Modification, as mutually deemed appropriate by the Board and Council;
- Endorsement by the Board; and
- Dissemination to interested and/or affected townships, agencies, organization and citizens.

It is anticipated that these guidelines will continue to evolve, as experience is gained in their application and new knowledge is acquired in these marine resource areas. Also, it is expected that the Council will next turn its attention to other areas of concern, such as the remaining ten of the fourteen marine resource problems defined by CEM in 1969—70 [46]. Other problem areas—brought to the attention of the Council by agencies, towns, communities, interest groups, and citizens—will also be given consideration. The experience of the Council will be brought to bear on these problems, thus continuing and improving the process of:

- Delineating problem areas;
- Identifying the state-of-the-art and knowledge gaps;
- Recommending data collection and research programs; and
- Preparing and coordinating policy and action guidelines.

Throughout this continuing process, it is expected that the aspects of technology transfer described herein will be employed, with evolutionary improvements made to accommodate the special characteristics of each problem.

4.0 UNIQUENESS OF THE COUNCIL GUIDELINES

4.1 Purpose of the Section

Multiple use of the coastal zone and conflicts arising therefrom are common to most shoreline communities in the U.S. today. With forecasts of increasing population concentrations in the coastal region, the environmental stresses already present will worsen. The planner will be forced to make increasingly difficult choices among alternatives; in such a context, the development of guidelines for marine resources planning and policy assumes enormous significance. The Council and its parent body, the Nassau-Suffolk Regional Planning Board have, accordingly, arrived at their Long Island Guidelines by a deliberate process of high-priority problem identification, analysis, evaluation of the state-of-the-art, delineation of needed research formulation of draft guidelines, subjecting them to critical review, and eventual endorsement of resulting guidelines. Since the problems are not uncommon in other coastal areas, it is of interest to determine the degree of correspondence with other area guidelines, if any. Also, the Council Guidelines have gone through a process of review and evaluation during which necessary and desirable modifications to the CEM-suggested guidelines have resulted. It is of some value to other resource planners to describe in summary form the scope and emphasis of such modifications, since they reflect the awareness of the community and bring out the value judgments of Long Island residents represented by the Council members. In effect, the purpose of this section is to examine the Council Guidelines in the light of other guidelines formulated for similar problems and/or similar situations.

4.2 Comparison of Final Council Guidelines with CEM Recommended Guidelines*

It is emphasized that, by and large, there is considerable correspondence between the Council Guidelines and those suggested by CEM as a result of their problem analysis and evaluation of the state-of-the-art. Here, the objective is to bring out, in summary form, significant differences, in style and substance. A problem-by-problem discussion follows.

4.2.1 Wetlands Management

The wetlands management guidelines of the Council integrates the priority research requirements with guidelines on policy and Council responsibility and activities. In addition to the classification and inventory of wetlands suggested by CEM, the priority research needs stress identification of wetlands values and management techniques, the development of a uniform use code, and a comprehensive wetlands management plan, as well as restoring wetlands. The policy guidelines of the Council expressly identify alternative means by which public ownership of remaining wetlands can be fostered, with a view to their preservation. The Council Guidelines also recommend establishment of uniform regulation for the use of individual tracts of wetlands, both private and public. As part of these regulations, environmental impact statements would be required for encroachment type activities on wetlands. The Council sees its role as a land-use advisory body to assist local governments in wetlands management and research.

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*Publication of this report has occurred prior to the Regional Planning Board's endorsement of the Council Guidelines. Therefore, only the general context of the guidelines is discussed in this section.

4.2.2 Coastal Stabilization and Protection

The Council's policy and planning guidelines on coastal stabilization and protection distinguish between (1) guidelines for the reduction of losses related to shore erosion, and (2) guidelines for shoreline maintenance and erosion control.

Land use management concepts and other legal tools, such as flood plain zoning and bluff hazard zoning, are specified for reducing losses related to shore erosion. On primary dune lines associated with barrier beaches and baymouth bars, construction is to be prohibited. All CEM-suggested guidelines are included in the more extensive Council Guidelines. Additionally, the Council would discourage the expenditure of public funds for shore protection on private lands without stipulation for public access.

The Council's research and analysis guidelines emphasize the need to critically evaluate the practice of constructing shore protection works. They recommend obtaining Federal funding for research on economical sand transfer techniques from deep waters to the shore, innovative fixed shore structures, and the dynamics of natural shore areas including wetland fringes. Under recommended local research, the Council Guidelines identify offshore sand inventory, sand transport in the littoral drift, sand bypassing systems at Shinnecock and Moriches inlets, and effects of sand mining on adjacent beaches. The description more specifically identifies, therefore, the details of the CEM guideline suggesting an inventorying of offshore sand deposits in sufficient detail to assess "the feasibility of using these sands to maintain and enhance major Long Island beaches." The Council Guidelines also recommend (1) a flood plain mapping project for Suffolk, and (2) the creation of an erosion control research team to study the legal, economic and political aspects of such programs.

4.2.3 Integrated Water Supply and Wastewater Disposal

The Council's research and analysis guidelines on groundwater/wastewater identify, in depth, ten topics for which research needs to be initiated, and fourteen topics for which research needs to be continued and expedited. Two comprehensive overall research programs (with several common elements) have been suggested in CEM guidelines. The Council Guidelines give greater emphasis to research on aspects of marine disposal of wastewaters; CEM's suggested research priority was on groundwater recharge. Advanced wastewater treatment research is stressed in both Council and CEM guidelines.

Both the Council Guidelines and CEM-suggested guidelines on groundwater/wastewater policy and planning have recommended programs of installation of sewage collection, treatment, and disposal systems, including ocean outfalls. However, CEM-suggested guidelines advocated (1) the use of groundwater as the continuing source of water supply for the region insofar as it can be used without degrading this source, and (2) the complete recycling of wastewater in the region by AWT-groundwater recharge. The Council Guidelines reflect an awareness of such an approach being a Long Island-unique goal, and also an awareness of the question connected with its feasibility. One of the Council Guidelines, therefore, states, "While continuing ocean disposal projects,

treatment of wastewaters should be of acceptable quality for ocean dumping but it must be recognized that this system lowers groundwater levels." CEM-suggested guidelines advocate prohibiting new sewer outfalls in embayments and Long Island Sound and phasing out existing outfalls in these areas as it becomes feasible; such site-specific criteria are not included in the Council Guidelines. The Council Guidelines specifically permit access over wetland areas where necessary for efficient and economic installation of important wastewater equipment.

4.2.4 Dredging and Dredge Spoil Disposal

A succinct comparison of the Council Guidelines and those suggested by CEM for dredging and spoil disposal is rendered complicated by the diversity of style, format and substance. A really fruitful comparison can only be achieved and differences perceived by the reader by references to the appropriate sections of the two documents. However, a list of some significant points includes:

- For the sake of brevity, CEM-suggested guidelines did not include any introductory material. For the same reason, no definitions or appendices were included. The Council Guidelines include both introductory material and supporting appendices.
- CEM-suggested guidelines recommended classifying dredging applications with a view to concentrating attention on "major" applications. The Council's Guidelines recommend considering each proposal on its own merits.
- The Council's Guidelines describe in detail the motivation and need aspects of applications, the criteria to be considered in evaluating projects, and the procedure for processing the applications. CEM-suggested guidelines did not include these, although these topics are developed in the CEM report, "Dredging on Long Island" [53].

4.3 Other Coastal Management Guidelines

In an effort to ascertain the current status of policy and planning guidelines for management of high-priority problems in the coastal zone, a literature review was made and persons knowledgeable in the area were contacted. No guidelines seem to exist which are equivalent to those CEM developed for the Marine Resources Council of Nassau and Suffolk Counties, New York. What does exist are either ambiguous general statements, such as "to enhance the ecology of the shoreline" or "to prevent further deterioration of the shoreline," most often in the preamble to legislation. Or, guidelines are in the form of very explicit statements providing criteria for the issuance of licenses, usually in the body of the legislative act. In some cases, guidelines for segments of the shoreline, with very limited objectives, have been issued (such as the Wetlands Guidelines of Connecticut's Department of Environmental Protection), usually by state agencies. (Florida and Michigan have general shoreline management guidelines in draft form.) To CEM's knowledge, as of this writing, the methodology employed in arriving at the Council's Long Island Guidelines, and the specific guidelines for the high priority problem areas of Long Island are unique to the work performed for the Council.

However, several states and Federal agencies have been concerned with the question of comprehensive planning in the coastal zone and in the formulation of guidelines for coastal resources management. In order to indicate the breadth of this concern, a short summary of the status of the efforts from a selected set of agencies is given below. (It is stressed that the list is just a sample and is by no means exhaustive.)

1. California	The state has a Comprehensive Ocean Area Plan. It has just established six regional and one state-level Coastal Zone Conservation Commissions. The first task of the new commissions will be to develop comprehensive management guidelines [61].
2. Connecticut	The state recently issued Inland and Coastal Wetlands Guidelines. Funding from Federal sources is awaited to develop additional plans and guidelines [61].
3. Delaware	The state has a recent Coastal Zone Management law covering manufacturing firms only. It requires that a comprehensive plan and guidelines be developed [61].
4. U.S. Dept. of the Interior	The Department does not have "management guidelines," but has a variety of regulations. The Bureau of Land Management will shortly issue some instructions for compliance with NEPA (environmental impact statements) requirements.
5. United States Environmental Protection Agency	The Agency has issued water quality criteria and approves the Water Quality Standards of the states. General shoreline management is not EPA's mission; it does not appear that EPA will issue any shoreline guidelines. The existing Water Quality Standards implicitly place certain limitations on shoreline construction and use.
6. Florida	The state has its fourth draft of state guidelines in review by its government agencies and expects further revision before public hearings [62].
7. Michigan	The state has a management plan including guidelines. It has held public hearings and the most recent revision is expected to be published in 1973 [62].
8. NOAA	The Coastal Zone Management Act is being administered through NOAA. It has developed guidelines for states in seeking funds for coastal zone planning. The Act is very state-oriented. The timing of issuance of comprehensive guidelines is uncertain, because of the present Federal budget situation.

9. Virginia and Maryland — The states are involved with the Chesapeake Bay Consortium and look to it for coastal zone management guidelines [62].

The summary above is a result of limited telephone and personal contact with selected officials and scientists in the respective agencies [62]. Its main objective, as explained above, is to indicate a sample of on-going efforts in this important area of national concern.

APPENDIX A

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APPENDIX A

REFERENCES AND BIBLIOGRAPHY

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APPENDIX B

REGIONAL MARINE RESOURCES COUNCIL MEMBERSHIP

(As of January 15, 1973)

APPENDIX B

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APPENDIX C

MEMBERSHIP OF COUNCIL COMMITTEES FOR GUIDELINES

As of September 25, 1972
(The date on which committee reports were due)

APPENDIX C

MEMBERSHIP OF COUNCIL COMMITTEES FOR GUIDELINES

As of September 25, 1972
(The date on which committee reports were due)

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Dr. John C. Baiardi	N.Y. Ocean Science Laboratory
Mr. Morris Colen	U.S. Army Corps of Engineers
Mr. James W. Godbolt	National Park Service
Mr. John E. Suydam	Public Representative
Mr. Nathaniel Talmadge	Public Representative

COMMITTEE ON DREDGING AND SPOIL DISPOSAL
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Mr. Edward Bevelander	Marine and Recreational Vehicles Division
Hon. John J. Burns	Suffolk County Executive
Mr. Carl Eisenschmeid	Civil Engineer
Mr. Louis Pinata	U.S. Army Corps of Engineers
Mr. Howard Quinn	N.Y. State Office of Planning Services
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APPENDIX D

AGENDAS OF PRESENTATIONS TO COUNCIL BY FEDERAL AGENCIES, 1972–73

APPENDIX D

AGENDAS OF PRESENTATIONS TO COUNCIL
BY FEDERAL AGENCIES, 1972—73

1. WETLANDS SEMINAR—September 15, 1972

Principal Participants: National Oceanic and Atmospheric Administration

Speaker	Topic
Hon. John V. N. Klein Suffolk County Executive Hauppauge, L.I., New York 11787	Setting the Stage
Mr. John R. Clark The Conservation Foundation 1717 Massachusetts Ave., N.W. Washington, D.C. 20036	The Value of Wetlands in their Natural State
Dr. Durbin Tabb Marine Biology Department University of Miami Marine Institute Miami, Florida Robert Troutman, Jr. c/o James D. Newton Co. 2800 Estero Blvd. Fort Myers, Florida	The Value of Wetlands in their Developed State
Dr. Robert Aron Director, Office of Ecology & Environmental Conservation NOAA, Rockville, Maryland 20852	Ecological/Biological Aspects of Wetlands Management
Dr. Robert Bish Associate Professor of Economics University of Southern California Los Angeles, California 90007	Legal/Economic Aspects of Wetlands Management
Dr. Robert Abel Director, Office of Sea Grant NOAA, Rockville, Maryland 20852	Introductory Remarks
Mr. Tom Olds Bureau of Sport Fisheries & Wildlife Boston, Massachusetts 02109	Guidelines for Wetlands Management at the Federal Level

WETLANDS SEMINAR (Continued)

Speaker	Topic
Mr. Arthur W. Brownell Department of Natural Resources State of Massachusetts Boston, Massachusetts 02202	Guidelines for Wetlands Management at the State Level
Ms. Sandra Slade, Attorney Crawford and Diamond 123 West Lancaster Avenue Wayne, Pennsylvania 19087	Guidelines for Wetlands Management at the Local Level
Dr. Robert Bish University of Southern California Los Angeles, California 90007	Socio-economic Research Needs for Wetlands Planning and Management
Dr. Bostwick H. Ketchum Woods Hole Oceanographic Institution Woods Hole, Massachusetts 02543	Biological Research Needs for Wetlands Planning and Management
Col. Robert R. Werner Office of the Chief of Engineers U.S. Army Washington, D.C. 20134	Engineering/Physical Research Needs for Wetlands Management
Mr. Joel L. Fisher EPA Arlington, Virginia 22209	Pollution Associated Research Needs in Wetlands Management
Mr. David H. Wallace Associate Administrator for Marine Resources National Oceanic & Atmospheric Administration Rockville, Maryland 20852	Summary

2. COAST STABILIZATION AND DREDGING SEMINAR—February 15, 1973

Principal Participants: U.S. Army Corps of Engineers (COE)

Speaker	Topic
Mr. Burton Boyd Waterways Experiment Station, COE	Waterways Experiment Station Research Activities
Mr. Leo Tobias Office of the Chief of Engineers, COE	Dredging Technology
Mr. Curtis L. Clark Office of the Chief of Engineers, COE	Legislation, Permits and Regulatory Procedures
Mr. Louis Pinata New York District, COE	Dredging and Spoil Disposal Activities on Long Island
Mr. M. E. Lemmerhirt Office of the Chief of Engineers, COE	Dredging Industry—Viewpoint
Mr. George M. Watts Office of the Chief of Engineers, COE	Coastal Engineering Research State-of-the-Art
Mr. John G. McAlear Office of the Chief of Engineers, COE	Findings of the National Shoreline Study
Mr. Gilbert Nersesian New York District, COE	Federal Beach Erosion Control Activities on Long Island
Mr. William V. McGuinness, Jr. Consultant	Summary